1) c) Find the divergence and the curl of the vector field.

$$F=\left(z^2 e^{-x}\right) i+\left(y^3 lnz\right) j+\left(x e^{-y}\right) k$$

$$\nabla . V=\frac{d V_1}{dx}+\frac{d V_2}{dy}+\frac{d V_3}{dz}$$

$$¿ -z^2 e^{-x}+3 y^2 lnz+0$$

$$Curl\, V=\nabla \times v=\begin{vmatrix} i & j & k \\ \frac{d V_1}{dx} & \frac{d V_2}{dy} & \frac{d V_3}{dz} \\ z^2 e^{-x} & y^3 lnz & x e^{-y} \end{vmatrix}$$

$$¿ \left(\frac{dx e^{-y}}{dy}-\frac{d y^3 lnz}{dz}\right) i-\left(\frac{dx e^{-y}}{dx}-\frac{d z^2 e^{-x}}{dz}\right) j+\left(\frac{d y^3 lnz}{dx}-\frac{d z^2 e^{-x}}{dy}\right) k$$

$$¿ \left(-yx e^{-y}-y^3 \frac{1}{z}\right) i-\left(e^{-y}-2 z e^{-x}\right) j+(0)$$

$$¿ \left(-yx e^{-y}-\frac{y^3}{z}\right) i-\left(e^{-y}-2 z e^{-x}\right) j$$